

Effect of Social Media Usage on Research Competences and Completion during COVID-19: Case of Pre-Service Health Sciences Researchers

Muhammad Zaheer Asghar (✉ zaheer.asghar@helsinki.fi)

University of Helsinki

Seema Arif

University of Management and Technology, Lahore

Pirita Seitamaa Hakkarainen

University of Helsinki

Junaid Sarfraz Khan

National University of Medical Sciences, Rawalpindi

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2 **during COVID-19: Case of Pre-Service Health Sciences Researchers**

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5 **Muhammad Zaheer Asghar*** MPhil, PhD zaheer.asghar@helsinki.fi
6 University of Helsinki, Department of Education, Helsinki, Finland

7 **Seema Arif** MPhil, PhD seema.arif@umt.edu.pk
8 University of Management and Technology, Department of Education, Lahore, Pakistan

9 **Pirita Seitamaa-Hakkarainen** PhD pirita.seitamaa-hakkarainen@helsinki.fi
10 University of Helsinki, Department of Education, Helsinki, Finland

11
12 **Junaid Sarfraz Khan** MBBS, FRCS, PhD, PhD registrar@numspak.edu.pk
13 National University of Medical Sciences, Rawalpindi, Pakistan

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31 *Correspondence: Muhammad Zaheer Asghar zaheer.asghar@helsinki.fi
32 University of Helsinki, Department of Education, Helsinki, Finland

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35 **Effect of Social Media Usage on Research Competences and Completion**
36 **during COVID-19: Case of Pre-Service Health Sciences Researchers**

37 **Abstract**

38 **Introduction:** Pandemic has proved to be a game-changer for higher education. The emerging
39 context of using different social media tools for timely completion of their graduate and
40 postgraduate research is evident among health sciences pre-service researchers during the
41 pandemic.

42

43 **Methods:** A cross-sectional survey was conducted with health sciences preservice researchers
44 (n=410) enrolled in postgraduate health sciences programs of the Pakistani universities. The Vitae
45 (2011) framework was considered to measure research competences of the pre-service researchers
46 with the factors of personal effectiveness (PE), research knowledge and intellectual abilities (KI),
47 research and governance (RG), and researcher's engagement and influence (EI) to disseminate
48 research. Conclusions explicitly focused on using Social Media are drawn from the Structure
49 Equation Model obtained via Smart PLS.

50

51 **Results:** The findings have highlighted that preservice health sciences researchers used different
52 forms of social media to support their research completion during COVID-19. Multimedia tools
53 helped pre-service researchers to share information through audio, video, and image sharing
54 service on various networks. Information management tools such as google docs and monkey
55 surveys were useful for data collection during COVID-19.

56

57 **Conclusion:** This study implicated that different forms of social media tools helped health
58 sciences pre-service researchers develop their research competences, such as personal
59 effectiveness, research governance, and research engagement, which ultimately influenced them
60 to complete their research tasks on time in pandemics.

61

62 **Keywords:** *Social Media Tools; Research Competences; Health Sciences; COVID-19; Research*
63 *Completion.*

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71 **Introduction**

72 The social chaos of COVID-19 had effect on education as well. It had a drastic effect on the world
73 economy, higher education across the world has also turned topsy-turvy. Higher education is the source
74 of the knowledge economy; therefore, its continuation was a big challenge. Hence, medical and health
75 workers and students were also at the forefront against COVID-19; their education, especially timely
76 completion of research, has been drastically affected. The education and research in health sciences
77 were of utmost importance for two reasons; prepare health researchers against the pandemic and for
78 research pandemic prevention and cure. The Higher Education Commission (HEC), Pakistan advised
79 all universities and higher education Institutions to switch to online mode so that the continuation of
80 education was not compromised.

81 The term "Social Media"(SM) refers to "the online technologies and practices that people use
82 to share opinions, insights, experiences, and perspectives" (1). ResearchGate, Mendeley, Google
83 Scholar, LinkedIn, Academia, Facebook, Twitter, and Google+ were the most frequently used SM sites
84 by graduate students for academic purposes (2). According to a recent estimate, social media is
85 increasingly becoming popular globally; more than 2.65 billion people were SM users, whereas this
86 figure is expected to cross 3 billion by 2021(3). Such rapid growth in SM users indicates that SM has
87 vast potential for knowledge sharing and networking (4). SM's use in health sciences is also extensive;
88 customers of the health sector may use it to get better information about health services, get reviews on
89 some therapeutic methods, or share their personal experiences about a health service (5). Social media
90 is connecting health sciences research with practice. It is also helping the researchers connect for
91 knowledge creation and dissemination. Though health sciences postgraduate students and faculty have
92 been social media (SM) users, they sought mostly social media for communication with their
93 supervisors, locating their target samples for data collection, and the use of social media in health
94 sciences education (6, 7), research, and practice has become a trending research area during pandemic
95 (8, 9).

96 The current research aims to investigate how SM tools helped (pre-service researchers enrolled
97 in postgraduate programs of health sciences) complement their research skills to complete their degrees.

98 **Literature Review**

99 Previous research reported that graduates' use of SM to develop research skills and timely completion
100 of research is limited (10, 11). Web 2.0 technologies have more significant potential to connect the
101 student researchers with their supervisors (12); SM creates virtual spaces where they can have one-to-
102 one meetings and direct feedback of the work instead of a passive review of the content, promoting
103 trust and collaboration between the students and supervisors. This combination of technology and
104 pedagogy provides innumerable ways to innovate and create virtual spaces where adequate research
105 supervision can occur (11, 13).

106 Some scholars do not positively view SM's use; they claim that students get distracted and lose
107 their focus, leaving a negative impact on researchers' productivity (14). Many scholars argue that SM's
108 use deteriorates students' mental and psychological well-being causing an addiction (1, 15-17).
109 According to previous research, the use of SM for pre-service researchers is more than spending leisure
110 time and making friendships; it may involve sharing opinions (18), online learning (19), information
111 exchange (20), personal promotion, submitting assignments (21), and dissemination of research outputs
112 (2). Graduate students use social media tools to update literature, data collection and storage. SM tools
113 also help students in collaboration, communication, and sharing of ideas. However, misinformation,
114 quality of information, restrictions are barriers to adopt SM tools for research purposes.

115 The current research has endeavored to clarify social media tools' role to enhance research
116 competences and the research completion process of the health sciences' postgraduate pre-service
117 researchers during the pandemic.

118 The study posed the following research questions:

119 **RQ1.** How much did health sciences' postgraduate students use different social media tools for
120 research purposes during the pandemic?

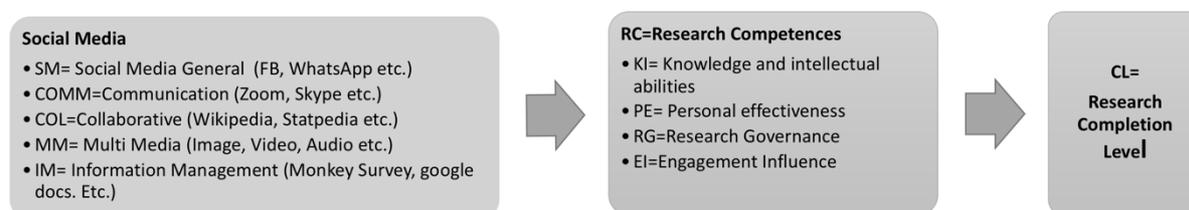
121 **RQ2.** What is the role of different social media tools to enhance research competences for the
122 postgraduate health sciences pre-service researchers' research completion process during a
123 pandemic?

124

125 **Conceptual Framework**

126 The current study has adopted Duman (22) classification of social media tools; social media usage in
 127 general (SM) such as Facebook, Tweeter and WhatsApp; communication (COMM) tools such as Zoom,
 128 Google hangout, Webinar and Skype; collaborative (COL) tools such as Wikipedia and Statpedia;
 129 multimedia (MM) tools such as image, video, and audio; information management (IM) tools such as
 130 Monkey survey and google doc. The Vitae (2011) research framework was considered to measure
 131 research competences of the graduate students with the factors of personal effectiveness (PE), research
 132 knowledge and intellectual abilities (KI), research and governance (RG), and researcher's engagement
 133 and influence (EI) to disseminate research (23).

134 A visual depiction of these domains is shown in Figure 1.



135

136 Figure 1. Conceptual framework

137

138

139 The study has the following hypotheses:

140 **H1.** There is an impact of social media tools on research competences development of the
 141 preservice health sciences researchers.

142 **H2.** There is a meditating role of research competences between social media tools and
 143 research completion.

144 **Methodology**

145 It was survey research conducted in a positivist paradigm. An institutional ethics committee approved
 146 the research plan. A G-power sample calculator was used to compute the sample size required for a
 147 study that uses a structural equation model (SEM). It was calculated that the minimum sample size 400
 148 was required, given the structural complexity of the model. A random sampling technique was used to
 149 select public ($n=4$) and private ($n=4$) universities with departments offering health sciences programs.
 150 A cross-sectional survey was conducted with health sciences' postgraduate level pre-service researchers

151 ($n=410$). The survey was filled by equal gender distribution of male ($n=204$) and female ($n=206$) health
 152 sciences students.

153 An instrument of social media usage for research by Duman (22) was adopted to conduct the
 154 survey. The instrument usage permission was taken from the author. A 5-point Likert type scale was
 155 used to measure the factors ranging from 1= *strongly disagree* to 5=*strongly agree*.

156 The data were entered into SPSS software. Data screening was performed for outliers and
 157 missing values. Robustness of the data was performed for the heterogeneity, endogeneity, and non-
 158 linearity. PLS-Smart software was used to assess the confirmatory factor analysis, reliability, and
 159 validity of the questionnaire (see appendix A) to proceed for mediation analysis at a bootstrapping level
 160 5000.

161

162 **Results**

163 The descriptive statistics showed that all factors were towards an agreement with normal skewness and
 164 kurtosis values ($-1.96 > x < 1.96$; see Table 1).

165 **Table 1.** Descriptive statistics

	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
COL	3.51	1.23	-0.76	0.12	-0.66	0.23
MM	3.62	1.24	-0.99	0.12	-0.45	0.23
IM	3.73	1.17	-1.10	0.12	0.15	0.23
SM	4.23	0.63	-1.38	0.12	1.84	0.23
PE	4.11	0.62	-0.31	0.12	-0.42	0.23
KI	4.21	0.66	-0.69	0.12	0.01	0.23
RG	4.10	0.61	-0.21	0.12	-0.46	0.23
EI	4.25	0.63	-0.51	0.12	-0.12	0.23
CL	3.24	1.25	-0.92	0.12	-0.46	0.23
COM	3.74	1.02	-0.96	0.12	-0.04	0.23

166

167 Structural equation model was assessed for the exogenous construct's effect size on endogenous
 168 variables, adjusted R-square and q-square (predict) of endogenous variables, and Stone-
 169 Geisser's predictive relevance (Q-square) of the endogenous variables according to Cohen (24)

170 guidelines of a small, medium, and large effect size with the values 0.02, 0.15 and 0.35 respectively as
 171 given in Table 2. The factor IM and COL were dropped from the model because of low values (see
 172 Table 2).

173 **Table 2. SEM model evaluation**

Variables		Exogenous effect		Endogenous Predictivity		
Factors	Sub factors	CL f-square	RC f-square	Q ² predict	Q ² (=1-SSE/SSO)	Adjusted R- Square
COL	-	-	0.012	-	-	-
COM	-	-	0.023	-	-	-
IM	-	-	0.018	-	-	-
MM	-	-	0.049	-	-	-
SMG	-	-	0.036	-	-	-
CL	-	-	-	0.463	0.416	0.423
RC	-	0.738	-	-	0.368	0.550
	EI	-	-	0.41	-	-
	IM	-	-	0.388	-	-
	KI	-	-	0.407	-	-
	RG	-	-	0.306	-	-

174

175 According to Hu and Bentler (25) suggestion, the model fit indices (NFI<0.9 and SRMR>0.05)
 176 were found satisfactory (see Table 3).

177 **Table 3. Model fit criteria**

	Saturated Model	Estimated Model
SRMR	0.039	0.049
d_ULS	0.068	0.109
d_G	0.06	0.092
Chi-Square	126.385	193.347
NFI	0.953	0.929

178

179 The SEM relations were studied for path coefficient and specific in-direct effects (see Figure 2).

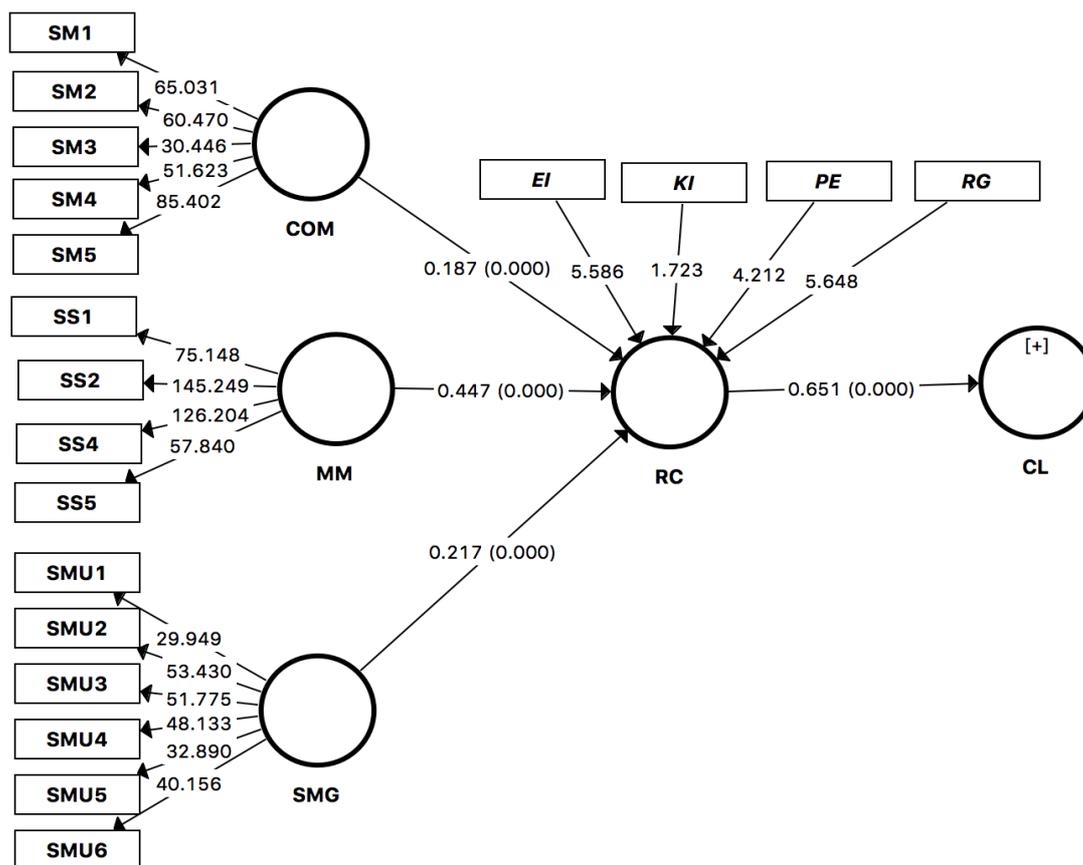


Figure 2. Effect of social media on research competences and completion

The path-coefficient, and relevant t-values at a bootstrap level 5000 were measured. Table 4 shows all significant paths with highest values for path: $RC \rightarrow CL$ ($\beta=0.653$, $SE=0.031$, $t(20.83)$ and $p<.001$) and weakest path: $COM \rightarrow RC$ ($\beta=0.189$, $SE=0.047$, $t(3.93)$ and $p<.001$). The weakest indirect effect: $COM \rightarrow RC \rightarrow CL$ ($\beta=0.123$, $SE=0.031$, $t(3.975)$, $p<0.001$) and strongest indirect effect is: $MM \rightarrow RC \rightarrow CL$ ($\beta=0.291$, $SE=0.037$, $t(7.784)$, $p<0.001$).

Table 4. Direct and specific indirect effect

Hypothesis		β	SE	t-value	p	Results
H1	COM \rightarrow RC	0.189	0.047	3.933	0.000	Not rejected
H2	MM \rightarrow RC	0.446	0.048	9.352	0.000	Not rejected
H3	RC \rightarrow CL	0.653	0.031	20.832	0.000	Not rejected
H4	SMG \rightarrow RC	0.218	0.043	5.001	0.000	Not rejected
H5	COM \rightarrow RC \rightarrow CL	0.123	0.031	3.975	0.000	Not rejected
H6	MM \rightarrow RC \rightarrow CL	0.292	0.037	7.784	0.000	Not rejected

192 **Discussion**

193 The study was aimed to measure different social media tool usage by health sciences pre-service
194 researchers during the pandemic. The study aimed to find social media's role in the students' research
195 competences development for their research completion process. The research questions under
196 discussion are:

197 ***RQ1.*** How much did health sciences' postgraduate pre-service researchers use different social
198 media tools for research purposes during the pandemic?

199 The results confirmed that with the increasing awareness of social media tools and technologies'
200 positive outcomes, their usage among graduate and postgraduate pre-service researchers is steadily
201 rising. Pre-service researchers are also very enthusiastic about discovering new techniques and methods
202 to enhance their research quality.

203 The student used social media such as Facebook, WhatsApp, and Instagram, to link with their
204 class fellows. Many governments have partnered with WhatsApp to provide updated information about
205 COVID-19 (4, 26-28). Pakistan health ministry and many other health agencies also provide 'real-time'
206 data about public health, and COVID-19 spread on Facebook and Twitter, which was of great concern
207 for health sciences researchers.

208 SM tools, Skype, and Zoom were extensively used by pre-service researchers enrolled in
209 postgraduate programs of health sciences which used for necessary communication with the supervisor
210 and conducting interviews. Knowledge sharing is one of the effective strategies for graduate research.
211 SM has infiltrated the academic life profusely; therefore, it is the time to harness this energy (29).
212 Faculty and students must exploit the SM resources to excellence in higher education systems by
213 creating informal chat groups intra-student, student-faculty, and interfaculty, for meeting research and
214 study goals.

215 Collaborative tools such as Wikipedia and Statpedia were also helpful for content development
216 and data analysis. Information management tools like google docs and monkey surveys proved useful
217 for data collection during COVID-19, while multimedia tools helped pre-service researchers to share
218 information through audio, video, and image sharing service for research dissemination. A study on

219 Wikipedia and Reddit showed that the correlation of collaborative social media site visits on COVID-
220 19 information was reduced with the increasing news of COVID-19 on other social media sources (30).
221 The same rule is also applicable for health sciences novice researchers who have data on other social
222 media networks.

223 This study has also concluded that different forms of social media tools also helped health
224 sciences pre-service researchers develop their research competences, such as personal effectiveness,
225 research governance, and research engagement, which ultimately resulted in timely completion of their
226 research tasks during pandemic.

227 Pre-service researchers used information management tools, such as Monkey surveys and
228 Google Docs, for data collection during the pandemic. Previous studies (3, 31, 32) showed that graduate
229 students had frequently used information management tools, file sharing, research databases, and
230 reference management tools to complete their research. The successful use of SM tools boosted the
231 self-efficacy and transformed their negative attitudes into positive ones (20, 33). Similarly, other studies
232 examining the students' perceptions and beliefs about social media indicated that social media tools'
233 utilization increased with a positive attitude towards social media (3, 31, 32). In their
234 thesis/dissertation's active writing process, graduate students used tools like reference management,
235 academic databases, online library catalog, and file services.

236 **RQ2.** What is the role of different social media tools to enhance research competences for the
237 postgraduate health sciences pre-service researchers' research completion process during a pandemic?

238 Multimedia tools such as video, audio, and images greatly influence research competency
239 development, leading to research completion. Multimedia tools are part of all social media sites and are
240 frequently used by health sciences preservice researchers. Research has shown effects of audio, video,
241 and image through digital and social media tools to develop language students' research competences
242 (34). Social media networks such as Facebook and Twitter also have a more substantial effect than other
243 social media tools on research competences and research completion process. A study in Malaysia has
244 shown that using social media enhances pre-service researchers' collaboration with faculty and peers,
245 their research engagement, and research skills (35).

246 The study has shown that collaborative social media tools were not essential to enhance
247 research competences for their research completion. Therefore, it was dropped from the model due to
248 its weak effects on research competences. Abilock (36) says that although collaborative social media
249 sites like Wikipedia are unreliable, our pre-service researchers still use them as a source of learning.

250 Information management tools have shown a weak effect on research competences in the
251 primary evaluation of the model. Information management tools were removed from the model because
252 their effect size on competences development was weak. Nevertheless, the information management
253 tools facilitated researchers in pandemic for data collection but not for research competences
254 development. Blount (37) confirms that information management tools such as google doc helped
255 gather and manage telework during COVID-19.

256 Social media communication tools such as zoom, google hangout, and webinars were useful
257 for developing research competences and research completion. Another research (38) depicted the same
258 result during the pandemic that showed the impact of social media on scholarly communication in
259 response to COVID-19. Our results align with previous research that information sharing and
260 knowledge sharing increased during COVID-19 (39), and graduate students used the SM sites to
261 improve their research competences (40). Increased use of social media sites enhanced students'
262 capability to use Web2.0 technologies for research purposes.

263 Knowledge sharing is one of the significant strategies of graduate research. Lovitts (2008) had
264 proclaimed that graduate students' immediate context affected their choice of SM tools for research.
265 The microenvironment, including interactions between the students and supervisor, influences tools and
266 willingness to complete research. This study has shown that social media influences research
267 competences, such as research engagement, research governance, and personal influence. Social media
268 influences pre-service researchers' research engagement due to its feature of networking, disseminating
269 information, and developing public awareness about recent research developments (41). Social media
270 has also proven as an essential tool for decision-making through bibliometrics measurement that helps
271 in research governance (42).

272

273 **Conclusion**

274 Preservice health sciences researchers used different forms of social media to support their research
275 completion process during COVID-19. The student used social media in general, such as Facebook,
276 WhatsApp, and Instagram, to interact with their class fellows, researchers, peers, and mentors. They
277 extensively used social media for research communication, such as Skype and Zoom. Collaborative
278 tools such as Wikipedia and Statpedia were also helpful for them. Multimedia tools helped pre-service
279 researchers to share information through audio, video, and image sharing service on all sorts of social
280 media networks. Information management tools such as google docs and survey monkey-were useful
281 sources for data collection during COVID-19.

282 Different forms of social media tools also helped health sciences pre-service researchers
283 develop their research competences, such as personal effectiveness, research governance, and research
284 engagement, which ultimately influenced them to complete their research tasks on time in pandemics.

285 **Implications**

286 Graduate education is not free and costs highly to its customers; developing countries and their
287 universities have limited resources to expand their research resources. The research is a much-wanted
288 product for a university's reputation and seeks higher worldwide rankings (43, 44). Timely completion
289 of the degree is obligatory in Pakistan; otherwise, its cost may rise inexplicably. Mostly, in the COVID-
290 19 scenario, the pre-service researchers who could connect with their supervisors were able to continue
291 their research. It was not a one-time situation; living in turbulent times, the universities must gear up
292 their staff and students to meet such challenges in the future. Higher education itself is slowly moving
293 towards emergent technologies for online and blended learning through social media networks.

294 **Declarations**

295 **Ethics approval and consent to participate**

296 The data collection in the present study was conducted after the approval of Universitat Oberta de
297 Catalunya, Barcelona, Spain ethics committee dated 20 May 2020. We confirm that all methods used
298 in this study were carried out in accordance with relevant guidelines and regulations. The

299 participation of students was completely voluntary and informed consent was obtained from all
300 participants or, if participants are under 18, from a parent and/or legal guardian.

301 **Consent for publication**

302 Not applicable.

303 **Availability of data and materials**

304 The datasets used and/or analyzed during the current study are available from the corresponding author
305 on reasonable request.

306 **Authors' contributions**

307 Asghar & Hakkarainen framed, organized and reviewed the study

308 Arif & Khan wrote the literature and discussion

309 Asghar & Arif performed data analysis, table formation and interpretation.

310 Hakkarainen & Khan revised the paper.

311 Asghar & Arif arranged references.

312 All authors reviewed the manuscript.

313 **Competing Interest**

314 The authors declare that they have no competing interests.

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319

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Figures

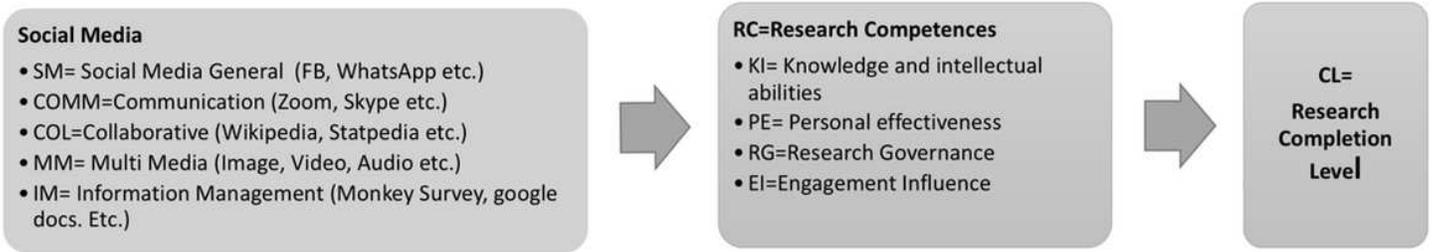


Figure 1

Conceptual framework

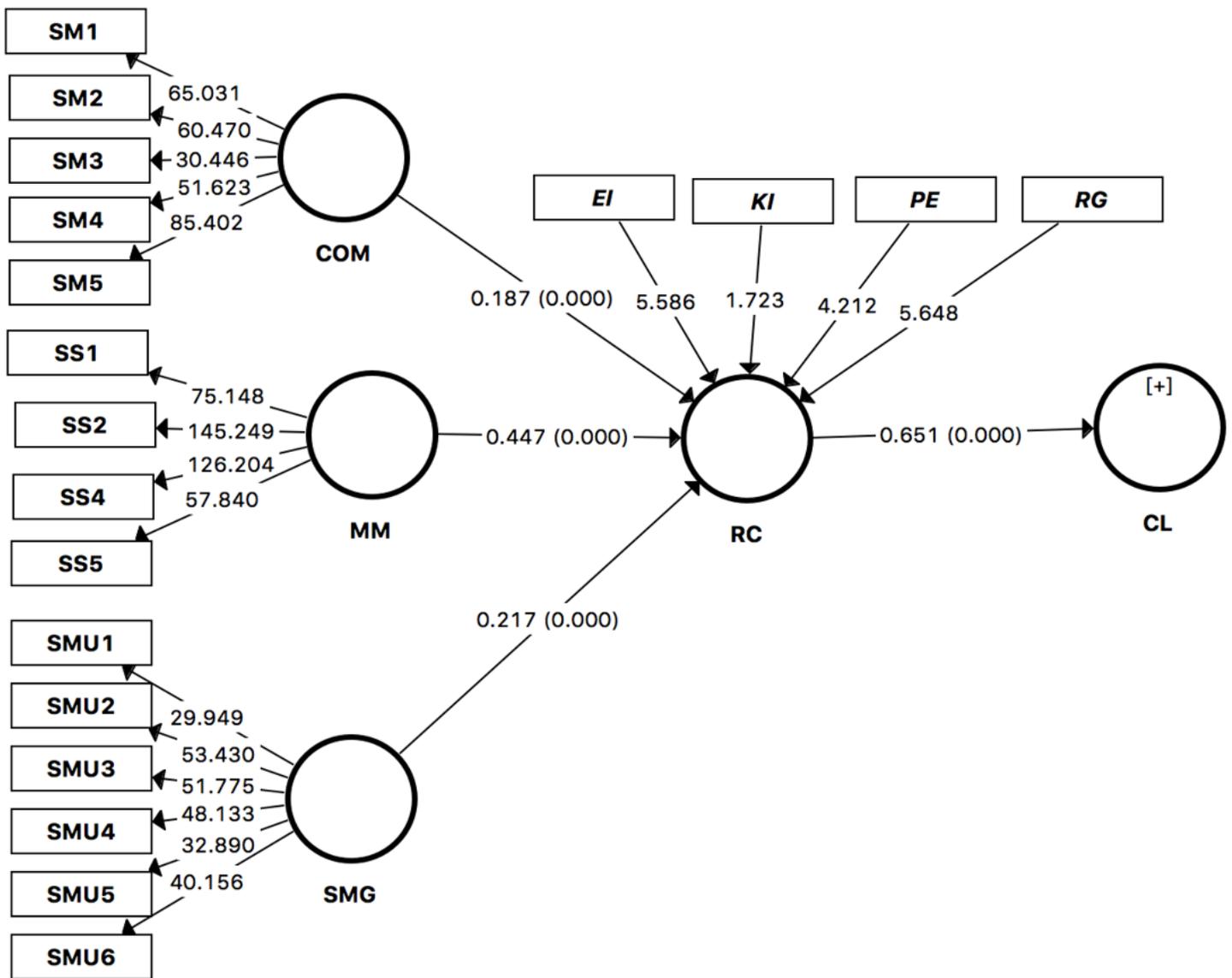


Figure 2

Effect of social media on research competences and completion

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